

# REVIEW

## Factoring Trinomials Practice

I will be able to factor a trinomial into two binomials. ( ) ( )

Key  
Name

### Factoring when there is a coefficient on the first term.

- 1.) Set up the box with four sections.
- 2.) Put the first **term** in the first box and the last **term** in the last box.
- 3.) Multiply the first **coefficient** by the last **coefficient**.
- 4.) Find **factors** of the **product** that add up to the middle coefficient.
- 5.) Put those two factors into the middle boxes.
- 6.) Find the **GCF** of the top two boxes. Put it on the top left.
- 7.) Put the leftovers across the top. <sup>(sides)</sup>
- 8.) Fill in the last spot on the side. These are your factor groups.

Example:  $7x^2 + 13x - 2$

$$7(-2) = -14$$

$$\begin{array}{r} -1 \ 14 \\ \hline 1 \ -14 \\ -2 \ 7 \end{array} = 13x$$

$7x^2$	$-x$
$14x$	$-2$

$$(7x-1)(x+2)$$

### Reasoning: Explain the mistake in each factoring problem.

- 1.) Multiply the binomials.

$$(2x + 1)(2x - 1)$$

$$4x^2 + 2x + 2x - 1$$

$$4x^2 + 4x - 1$$

Mistake: one of the  $2x$ 's should be  $-2x$

$$4x^2 - 2x + 2x - 1$$

$$\text{should be } 4x^2 - 1$$

- 2.) Factor the polynomial  $x^2 + 10x - 11$

The factors are  $(x - 11)(x - 1)$

$$\begin{array}{r} -11 \\ +11 \end{array} \bigg| -1$$

Mistake: should be  $(x+11)(x-1)$

$$-11(-1) \text{ would be } +11 \text{ and adds to } -1$$

### Problem Solving: Factor the trinomials into two binomial groups.

Choice 1:

Factor each trinomial.

3.)  $x^2 + 8x + 16$

$$(x+4)(x+4)$$

$$\begin{array}{r} 16 \\ 8 \ 2 \rightarrow 10 \\ 4 \ 4 \rightarrow 8 \end{array}$$

4.)  $x^2 + 10x - 11$

$$(x+11)(x-1)$$

$$\begin{array}{r} -11 \\ 11 \ -1 \rightarrow 10 \\ -11 \ 1 \end{array}$$

5.)  $x^2 - 3x - 18$

$$(x-6)(x+3)$$

$$\begin{array}{r} -18 \\ -2 \ 9 \rightarrow -17 \\ -9 \ 2 \rightarrow -17 \\ -6 \ 3 \end{array}$$

6.)  $x^2 - 8x + 7$

$$(x-1)(x-7)$$

$$\begin{array}{r} 7 \\ 1 \ 7 \rightarrow 8 \\ -1 \ -7 \rightarrow -8 \end{array}$$

7.)  $x^2 + 22x + 40$

$$(x+2)(x+20)$$

$$\begin{array}{r} 40 \\ 2 \ 20 \rightarrow 22 \\ 4 \ 10 \rightarrow 14 \end{array}$$

8.)  $x^2 - 11x + 24$

$$(x-3)(x-8)$$

$$\begin{array}{r} 24 \\ -6 \ 4 \rightarrow -2 \\ -8 \ -3 \end{array}$$

Factor out the GCF, then finish factoring completely by making the leftovers two binomials ( ) ( ).

9.)  $2x^3 + 16x^2 + 24x$  gcf:  $2x$

$2x(x^2 + 8x + 12)$

$2x(x+2)(x+6)$

$\begin{array}{r} 12 \\ 3 \overline{) 4} \rightarrow 1 \\ \underline{3} \phantom{0} \\ 1 \end{array}$

10.)  $3x^3 + 27x^2 + 42x$  gcf:  $3x$

$3x(x^2 + 9x + 14)$

$3x(x+2)(x+7)$

$\begin{array}{r} 14 \\ 2 \overline{) 7} \rightarrow 7 \end{array}$

11.)  $6y^3 - 18y^2 + 12y$  gcf:  $6y$

$6y(y^2 - 3y + 2)$

$6y(y-1)(y-2)$

~~12.)~~  $2x^3 + 16x^2 + 24x$  gcf:  $2x$

$2x(x^2 + 8x + 12)$

$2x(x+2)(x+6)$

$\begin{array}{r} 12 \\ 2 \overline{) 6} \end{array}$

13.)  $4x^2 + 4x + 1$  gcf:  $1$

$\begin{array}{cc} 2x & 1 \\ 2x & 4x^2 & 2x \\ 1 & 2x & 1 \end{array}$

$\begin{array}{r} 4(1) \\ 4 \\ 2 \overline{) 2} \end{array}$

$(2x+1)(2x+1)$

14.)  $9x^2 - 6x + 1$  gcf:  $1$

$\begin{array}{cc} 3x & -1 \\ 3x & 9x^2 & -3x \\ -1 & -3x & 1 \end{array}$

$\begin{array}{r} 9(1) \\ 9 \\ -3 \overline{) 3} \rightarrow -6 \end{array}$

$(3x-1)(3x-1)$

Choice 2:

Factor each trinomial.

3.)  $6x^2 + x - 2$

$6(-2)$

$\begin{array}{r} -12 \\ 2 \overline{) -6} \rightarrow -4 \\ 3 \overline{) -4} \rightarrow -1 \\ -3 \overline{) 4} \rightarrow 1 \end{array}$

$\begin{array}{cc} 2x & -1 \\ 2x & 6x^2 & -3x \\ 2 & 4x & -2 \end{array}$

$(2x-1)(3x+2)$

4.)  $3x^2 - 2x - 8$

$-24$

$\begin{array}{r} -3 \overline{) 8} \rightarrow 5 \\ -4 \overline{) 6} \rightarrow 2 \\ 4 \overline{) -6} \rightarrow -2 \end{array}$

$\begin{array}{cc} 3x & 4 \\ x & 3x^2 & 4x \\ -2 & -6x & -8 \end{array}$

$(3x+4)(x-2)$

5.)  $10x^2 + 7x - 12$

$\begin{array}{r} -120 \\ 10 \overline{) -12} \\ 20 \overline{) -6} \\ 15 \overline{) -8} \end{array}$

$\begin{array}{cc} 2x & 3 \\ 5x & 10x^2 & 15x \\ -4 & -8x & -12 \end{array}$

$(5x-4)(2x+3)$

7.)  $5x^2 + 6x - 8$

$5(-8)$

$\begin{array}{r} -40 \\ 10 \overline{) -4} \rightarrow 6 \\ -2 \overline{) 20} \rightarrow 18 \end{array}$

$\begin{array}{cc} 5x & 2 \\ 5x & 5x^2 & 10x \\ -4 & -4x & -8 \end{array}$

$(x+2)(5x-4)$

Factor out the GCF, then finish factoring completely by making the leftovers two binomials ( ) ( ).

8.)  $2x^3 + 16x^2 + 24x$  gcf:  $2x$

$2x(x^2 + 8x + 12)$

$2x(x+2)(x+6)$

9.)  $4x^2 + 4x + 1$  gcf:  $1$

$\begin{array}{cc} 2x & 1 \\ 2x & 4x^2 & 2x \\ 1 & 2x & 1 \end{array}$

$\begin{array}{r} 4(1) = 4 \\ 4 \\ 2 \overline{) 2} \end{array}$

10.)  $9x^2 - 6x + 1$  gcf:  $1$

$\begin{array}{cc} 3x & -1 \\ 3x & 9x^2 & -3x \\ -1 & -3x & 1 \end{array}$

$(3x-1)(3x-1)$

11.)  $3s^2 - 6s + 3$  gcf:  $3$

$3(s^2 - 2s + 1)$

$3(s-1)(s-1)$

$\begin{array}{r} 1 \\ -1 \overline{) -1} \rightarrow -2 \end{array}$

~~12.)~~  $3s^2 - 6s + 3$

13.)  $3m^3 - 9m^2 + 6m$  gcf:  $3m$

$3m(m^2 - 3m + 2)$

$3m(m-1)(m-2)$